CLAIMS:

1. A transparent underfill composition comprising a curable resin in combination with a solvent and a filler of colloidal silica that is functionalized with at least one organoalkoxysilane.

2. A composition as in claim 1, wherein the resin is selected from the group consisting of epoxy resins, acrylate resins, polyimide resins, fluorocarbon resins, fluororesins, benzocyclobutene resins, bismaleimide triazine resins, fluorinated polyallyl ethers, polyamide resins, polyimidoamide resins, phenol resol resins aromatic polyester resins, polyphenylene ether resins and polydimethyl siloxane resins.

3. A composition as in claim 1, wherein the resin is selected from the group consisting of aliphatic epoxy resins, cycloaliphatic epoxy resins, and silicone- epoxy resins.

4. A composition as in claim 1, wherein the resin is an aromatic epoxy resin.

5. A composition as in claim 4, wherein the aromatic epoxy is a cresol-novolac epoxy.

6. A composition as in claim 1, wherein the composition further comprises a resin hardener.

7. A composition as in claim 1, wherein the solvent is selected from the group consisting of 1-methoxy-2-propanol, butyl acetate, methoxyethyl ether, methoxy propanol acetate and methanol.

8. A composition as in claim 1, wherein the colloidal silica is functionalized with phenyl trimethoxysilane.

9. A composition as in claim 8, wherein the colloidal silica is endcapped by a silylating agent.

10. A composition as in claim 9, wherein the silylating agent is hexamethyldisilazane.

11. A composition as in claim 1, wherein the filler of colloidal silica further comprises silicon dioxide in an amount ranging from about 15 wt.% to about 75 wt.% of the composition.

12. A composition as in claim 11, wherein the colloidal silica has a particle size ranging from about 5 nm to about 100 nm.

13. A composition as in claim 12, wherein the colloidal silica is uniformly distributed throughout the resin.

14. A composition as in claim 13, wherein the colloidal silica is stable at room temperature.

15. A composition as in claim 1, wherein the composition further comprises a catalyst selected from the group consisting of triphenyl phosphine, N-methylimidazole, and butyl tin dilaurate.

16. A composition as in claim 1, wherein the composition further comprises additives selected from the group consisting of flame retardants, adhesion promoters, reactive organic diluents, curing agents, and combinations thereof.

17. A composition as in claim 16, wherein the reactive organic diluent comprises a monofunctional epoxy.

18. A transparent underfill composition comprising an epoxy resin in combination with a solvent and a functionalized colloidal silica dispersion wherein the functionalized colloidal silica further comprises silicon dioxide in the range of about 15 wt.% to about 75 wt.% of the functionalized colloidal silica dispersion.

19. A composition as in claim 18, wherein the epoxy resin is cresol novolac epoxy resin.

20. A composition as in claim 19, wherein the composition further comprises a novolac hardener.

21. A composition as in claim 18, wherein the solvent is 1-methoxy-2-propanol.

22. A composition as in claim 18, wherein the functionalized colloidal silica has a particle size ranging from about 5 nm to about 50 nm.

23. A composition as in claim 18, wherein the composition further comprises a catalyst selected from the group consisting of triphenyl phosphine, N-methylimidazole, and butyl tin dilaurate.

24. A solid state device comprising:

a chip;

a substrate; and

a transparent underfill composition between the chip and the substrate comprising an aromatic epoxy resin in combination with a solvent and a functionalized colloidal silica dispersion wherein the functionalized colloidal silica is functionalized with at least one organoalkoxysilane.

25. A solid state device as in claim 24, wherein the functionalized colloidal silica has a particle size ranging from about 5 nm to about 50 nm.

26. A solid state device as in claim 24, wherein the solvent is selected from the group consisting of 1-methoxy-2-propanol, butyl acetate, methoxyethyl ether, methoxy propanol acetate and methanol.

27. A solid state device as in claim 24, wherein the resin wafer coating further comprises additives selected from the group consisting of resin hardeners, resin catalysts, flame retardants, adhesion promoters, reactive organic diluents, curing agents, and combinations thereof.

28. A transparent composition of matter for use in forming an underfill comprising a curable resin in combination with a solvent and a filler of colloidal silica that is functionalized with at least one organoalkoxysilane.

29. A composition as in claim 28, wherein the resin is selected from the group consisting of aliphatic epoxy resins, cycloaliphatic epoxy resins, and silicone- epoxy resins.

30. A composition as in claim 28, wherein the resin is an aromatic epoxy resin.

31. A composition as in claim 28, wherein the solvent is selected from the group consisting of 1-methoxy-2-propanol, butyl acetate, methoxyethyl ether, methoxy propanol acetate and methanol.

32. A composition as in claim 28, wherein the colloidal silica is functionalized with phenyl trimethoxysilane.

33. A composition as in claim 32, wherein the colloidal silica is endcapped by a silylating agent.

34. A composition as in claim 33, wherein the silylating agent is hexamethyldisilazane.

35. A composition as in claim 28, where the composition is a transparent B-stage resin.

36. A method for producing a transparent underfill composition comprising:

functionalizing colloidal silica such that a stable concentrated dispersion of colloidal silica is formed;

forming a concentrated dispersion of functionalized colloidal silica containing about 15 wt.% to about 75 wt.% silica;

blending solutions of epoxy monomers with the functionalized colloidal silica dispersion;

removing the solvent to form a hard, transparent B-stage resin film; and

curing the transparent B-stage resin film to form a low CTE, high Tg thermoset resin.

37. The method of claim 36 wherein the step of functionalizing colloidal silica comprises functionalizing colloidal silica with phenyl trimethoxysilane.

38. The method of claim 36 wherein the step of forming a concentrated dispersion of functionalized colloidal silica comprises placing the functionalized colloidal silica at a temperature ranging from about 20°C. to about 140°C. under a vacuum ranging from about 0.5 Torr to about 250 Torr.

39. The method of claim 36 wherein the step of blending solutions of epoxy monomers with the functionalized colloidal dispersion further comprises adding to the solution of epoxy monomer an additive selected from the group consisting of selected from the group consisting of flame retardants, adhesion promoters, reactive organic diluents, curing agents, and combinations thereof.

40. The method of claim 36 wherein the step of blending solutions of epoxy monomers with functionalized colloidal silica comprises placing the epoxy monomers in a solvent selected from the group consisting of 1-methoxy-2-propanol, butyl acetate, methoxyethyl ether, methoxy propanol acetate and methanol.

41. The method of claim 36 wherein the step of curing the transparent B-stage resin film comprises placing the B-stage resin film at a temperature ranging from about 50°C to about 250°C in a vacuum at a pressure ranging from about 75 mmHg to about 250mmHg.

42. A transparent B-stage resin film made by the process of claim 36.

43. A low CTE, high Tg thermoset resin made by the process of claim 36.